UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/579,191	08/02/2006	Tadashi Komoto	2006_0721A	6698

513 7590 12/22/2009

WENDEROTH, LIND & PONACK, L.L.P.
1030 15th Street, N.W.,
Suite 400 East
Washington, DC 20005-1503

EXAMINER	
DYE, ROBERT C	
ART UNIT	PAPER NUMBER
1791	
MAIL DATE	DELIVERY MODE
12/22/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/579,191	KOMOTO ET AL.	
	Examiner	Art Unit	
	ROBERT DYE	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 November 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *29-31,33-38 and 41-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *29-31,33-38 and 41-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This is a Non-Final Office Action in response to Applicant's Request for Continued Examination, dated 11/18/2009. Claims 29-31, 33-38, and 41-50 are pending.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 43 and 45-50 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

4. Applicant states that support for the new claims can be found in the working examples of specification (pg 20, line 31-pg 26, line 12 and Table 1). While the specification cites the use of Noryl GTX resin, particularly GTX 6601, in Example 1; the specification does not disclose the use of GTX 6013 or GTX 944 and does not disclose the Notched Izod Impact Strength (ASTM D 256).

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 43-49 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Claims 42-49 contain the trademark/trade name Noryl GTX. Where a trademark or trade name is used in a claim as a limitation to identify or describe a particular material or product, the claim does not comply with the requirements of 35 U.S.C. 112, second paragraph. See *Ex parte Simpson*, 218 USPQ 1020 (Bd. App. 1982). The claim scope is uncertain since the trademark or trade name cannot be used properly to identify any particular material or product. A trademark or trade name is used to identify a source of goods, and not the goods themselves. Thus, a trademark or trade name does not identify or describe the goods associated with the trademark or trade name. In the present case, the trademark/trade name is used to identify/describe a polymer allow in which a polyphenylene phase is dispersed in a matrix phase of an aliphatic polyamide and, accordingly, the identification/description is indefinite.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 29-31 and 34-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP2002-248649 (Foreign Patent Publication and partial translation, already of record) in view JP1-310924 (Foreign Patent Publication and partial translation, already of record), JP1-69314 (Foreign Patent Publication and partial translation, already of record), JP 7-60556 (Foreign Patent Publication and partial translation, already of record) and Kasai et al. (USP 5,109,052).

11. Regarding claim 29, JP2002-248649 (hereinafter '649) teaches a method of manufacturing a resin-coated metal gear comprising a step of pre-heating mold above 40°C (mold temperature: 80°C, paragraph 16), a step of injection molding the resin onto the insert, and a cooling step. '649 does not explicitly state a holding step; however, such a step would inherently take place in the injection molding operation of '649. Any miniscule passage of time between injection of the resin and removal of the product would constitute a holding step.

12. Document '649 does not teach a step wherein the insert is preheated. In the same field of endeavor of insert molding, JP1-310924 (hereinafter '924) teaches a method wherein a metal or ceramic insert is preheated before insertion into the die in

order to prevent peeling of the applied resin (see Table 1 and examples 1, 2, and 4). Document '924 discloses the use of a pre-heated mold and insert within the claimed ranges (mold temperature of 150C, pg 2, line 10; nozzle temperature for resin is 390C for examples 1 and 2, 290C for example 4, Table 1 lists the insert part's temperature at time of injection and notes that no peeling occurs unlike the comparative examples wherein no-preheating is carried out). It would have been obvious to a person having ordinary skill in the art at the time the invention was made to preheat the metal gears as taught by '924 in the method disclosed in '649 for the benefit improving the adhesive properties of the resin to the insert by preventing the occurrence of peeling (Table 1 and example 1).

13. The hypothetical combination of '649 and '924 still does not teach a step wherein the insert is removed from the die and then gradually cooled; however, in the same field of endeavor of injection molding articles, JP1-69314 (hereinafter '314) teaches a method wherein an injection molded article is slowly cooled following injection for the purpose of achieving constant shrinkage and eliminating problems of inner strain or dimensional scattering due to quenching (pg 5 of partial translation). Thus, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have slowly cooled the molded article as taught by '314 in the method of the combination '649 and '924 for the purpose of achieving constant shrinkage and reduced inner strain (pg 5).

14. The hypothetical combination of '649, '924 and '314 still does not teach a step wherein the insert material is subjected to a shot-blasting treatment and a silane

coupling treatment. In the same field of endeavor of manufacturing insert parts with synthetic resin coverings, '556 teaches a method wherein a shot blast and silane-coupling treatment are applied to the metal surface for the purpose of increasing the bonding strength between the metal insert and the synthetic resin (paragraphs 44-45). Thus, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to perform a shot blast and silane-coupling treatment as taught by '556 in the method of combination of '649, '924 and '314 for the purpose of increasing the bonding strength of the applied resin to the insert (paragraphs 44-45).

15. Regarding the type of resin employed in coating of the metal gears, '649 discloses the use of nylon 66, an aliphatic polyamide, as the resin. '649 does not teach a method wherein the resin comprises a polymer alloy in which a polyphenylene phase is dispersed in a matrix phase of an aliphatic polyamide. Kasai et al. teaches that while polyamide resins have excellent mechanical strength and resistances, they are inferior to other plastics with respect to dimensional stability, insusceptibility to moisture absorption, heat distortion resistance, and impact resistance in the dry state (col 1, lines 35-43). Kasai further teaches that blending with polyphenylene ether resins has been attempted to attain effective utilization of desired properties inherent in both the polyamide and PPE resins (col 1, lines 52-55). Kasai et al. (hereinafter Kasai) discloses a thermoplastic resin composition which is described as a polyphenylene ether dispersed in a continuous (matrix) phase of a polyamide (abstract; nylon used as polyamide, col 5, lines 45-46). Said resin has an excellent balance of thermal stability, heat distortion resistance, impact resistance, oil resistance, and stiffness, etc., and,

hence, is useful as an engineering material (abstract, Kasai notes that it is useful in the field of automobiles; '649 discloses a resin coated worm gear for an automobile). It would have been obvious to a person having ordinary skill in the art at the time of the invention to employ a copolymer of polypenylene ether and polyamide as taught by Kasai in the method of '649, '924, '314, and '556 for the purpose of employing a resin with a balance of stability, strength and resistance.

16. Regarding claim 30, '649 teaches the method for making an insert-containing resin gear such as a worm wheel (paragraph 1). Such a wheel is used for transmitting power.

17. Regarding claim 31, '649 teaches that the gear is made of iron (paragraph 16).

18. Regarding claim 34, wherein the resin-coated metal gears have suppressed resin crack and resin peeling, the examiner notes that the steps taught and discussed above would result in such properties.

19. Regarding claims 35 and 36, the matter of whether the gears that have been coated with a resin intermesh with gears that have been coated with a resin or not is merely one of design and as such can be configured in an appropriate matter by a person having ordinary skill in the art.

20. Regarding claims 37 and 38, wherein the resin-coated metal gears obtained by the method of claim 29 have impact resistance and fatigue resistance superior to that of a resin-made gear, the cited combination of prior art teaches the method of claim 29 as described above and the properties of increased impact and fatigue resistance would be

expected to be inherent as a result of applying a resin coating to a metal gear in a manner as described in the claimed method.

21. Regarding claim 41, the preheating temperatures of the insert and mold as taught by '924 and discussed above for claim 29 falls within the claimed ranges (mold temperature of 150C, pg 2, line 10; nozzle temperature for resin is 390C for examples 1 and 2, 290C for example 4, Table 1 lists the insert part's temperature at time of injection and notes that no peeling occurs unlike the comparative examples wherein no-preheating is carried out).

22. Regarding claims 42, 44, 46, and 48, the Examiner considers polyphenylene ether and polyamide blends of Noryl GTX 6601, GTX 6013, and GTX 944, which are not described in detail in the specification, to be generic an obvious variant of the PPE/PA blends taught by Kasai et al..

23. Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ Noryl GTX resins, since it has been held to be within the ordinary skill of a worker in the art to select a known material on the basis of its suitability for the intended use. Sinclair & Carrol Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945).

24. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP2002-248649 (partial translation, already of record) in view of JP1-310924 (partial translation, already of record), JP1-69314 (partial translation, already of record), JP 7-60556 (partial

translation, already of record) and Kasai et al. (USP 5,109,052) as applied to claim 29 above, and further in view of Kitahata et al. (PG Pub 2003/0013475).

25. The previously stated combination of '649, '924 '314, '556 and Kasai teaches a method of making a resin-coated gear as described above for claim 28, but does not teach a method wherein the resin applied to the surface of the insert member has a thickness in a range of 5μm to 30mm. In the same field of endeavor or making resin coated articles, Kitahata et al. (hereinafter Kitahata) teaches a resin coated gear wherein the thin resin layer has a thickness set between 100um to 250um for the purpose of achieving reduced working noise and wear (paragraph 35). It would have been an obvious for a person having ordinary skill in the art at the time the invention was made to use the thickness as taught by Kitahata in the aforementioned combination for the purpose of ensuring a sufficiently thick coating on the surface of the gears to achieve noise and wear reduction (paragraph 35).

26. Claims 43, 45, 47, 49, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP2002-248649 (partial translation, already of record) in view of JP1-310924 (partial translation, already of record), JP1-69314 (partial translation, already of record), JP 7-60556 (partial translation, already of record) and Kasai et al. (USP 5,109,052) as applied to claim 29 above, and as evidenced by the Material Technical Datasheets for GTX 6601, 6013, and 944 resins (MatWeb).

27. Regarding claims 43, 45, 47, 49 and 50, the Noryl GTX resins of claims 44, 46, and 48 are known to possess the claimed Notched Izod Impact Strengths as evidenced by the cited technical data sheets.

Response to Arguments

28. Applicant's arguments filed 11/18/2009 have been fully considered but they are not persuasive. Applicant's arguments are summarized as follows:

a. One of ordinary skill in the art would have no reason or rationale to combine Kasai with JP2002-248649, JP1-310924, JP1-69314 and JP7-60556.

b. JP2002-248649 does not teach or suggest a preheating step of heating the metal gears to a predetermined temperature within a range of from 40C to a metl injection temperature of the resin and a mold for molding to a predetermined temperature within a range of from 40C to a (melt injection temperature of the resin – 50C). The combination of the resin and preheating as claimed provides unexpected and superior advantages over the art.

29. Regarding the combination of Kasai and '649 (combined), JP2002-248649 discloses the injection molding of a polyamide resin (nylon 66) onto the tooth regions of a metal gear which can be used in the production of automobiles. Kasai teaches that while polyamides have excellent mechanical strength, oil resistance, abrasion resistance, and thermal resistance and are considered a typical engineering plastic, they are known to have the disadvantage of being inferior to other plastics with respect to properties of dimensional stability, insusceptibility to moisture absorption, heat distortion resistance under high load, and impact resistance in the dry state (col 1, lines 35-44). Kasai teaches that an improved engineering material can be obtained by dispersing PPE within a continuous phase of PA. Thus, Kasai provides motivation for

blending the polyamide with PPE to produce a composition in which the disadvantages of the two resins are compensated for each other while retaining their own advantages.

30. Regarding the heating of the metal gears and mold, while '649 discloses heating of the mold but is silent on expressly heating the gears. However, in molding polymer material onto metal preforms, '924 (as discussed in the rejection) teaches a method wherein a preform and mold are both preheated to temperatures above 40C and below the melting point of the polymer as claimed. '924 teaches this prevents peeling of the molded plastic from the preform. Thus, '924 provides motivation for preheating both the preform and mold. In response to applicant's argument that the preheating step results in a molding having no cracks, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Conclusion

31. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

32. Arashiro et al. (USP 5,244,983) discloses a polyphenylene ether resin blended with a secondary resin (including polyamide) to produce a resin with organic solvent resistance and excellent mechanical strength to produce machine parts such as gears (col 1, line 5-24).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT DYE whose telephone number is (571)270-7059. The examiner can normally be reached on Monday to Friday 8:00AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph S. Del Sole can be reached on (571)272-1130. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/RCD/

/Joseph S. Del Sole/

Supervisory Patent Examiner, Art Unit 1791